

CLAIMS

1. A device for winding an element built up of at least one elongate, threadlike strand on a winding element, said device comprising a frame provided with at least:
 - an inlet for the elongate, threadlike element, and
 - a winding element to be rotatably driven about a winding shaft,said device furthermore comprising drive means at least for rotatably driving the winding element, **characterized in that** twisting means are mounted in the frame, which twisting means impart one or more turns per unit length to the elongate, threadlike element before said elongate, threadlike element is wound on the winding element.
2. A device according to claim 1, **characterized in that** the twisting means comprise a twisting shaft to be rotatably driven by the drive means, which twisting shaft is mounted in bearings in the frame, in such a manner that a first end of the twisting shaft is located within the frame and the other, second end of the twisting shaft is located outside the frame.
3. A device according to claim 2, **characterized in that** the drive means are at least partially disposed outside the frame and drive the second end of the twisting shaft rotatably.
4. A device according to claim 2 or 3, **characterized in that** the winding element can be mounted in bearings on the winding shaft, and the winding shaft is connected to the first end of the twisting shaft via bearings.
5. A device according to claim 4, **characterized in that** the winding shaft is in line with the twisting shaft.
6. A device according to any one or more of the claims 2-5, **characterized in that** the twisting means furthermore comprise at least one radially extending twisting arm mounted on the first end of the

twisting shaft, which twisting arm is provided with a feed-through channel for the elongate, threadlike element, which extends from the free end of the twisting arm to the twisting shaft.

7. A device according to claim 6, **characterized in that** the twisting arm may be provided with a guide eye at its free end, which guide eye connects to the feed-through channel.

8. A device according to claim 6 or 7, **characterized in that** the feed-through channel is a slot formed in the surface of the twisting arm.

10. 9. A device according to claim 6 or 7, **characterized in that** the feed-through channel is a bore formed in the surface of the twisting arm.

10. 10. A device according to any one or more of the claims 6-9, **characterized in that** the guide eye and/or the feed-through channel are provided with a material having an enhanced hardness.

15. 11. A device according to claim 10, **characterized in that** the guide eye and/or the feed-through channel are provided with ceramic guide surfaces.

12. 12. A device according to any one or more of the claims 6-11, **characterized in that** the twisting arm is provided with a counterweight at the other end of the twisting shaft, seen in the longitudinal direction of the twisting arm.

13. 13. A device according to any one or more of the claims 2-12, **characterized in that** the twisting shaft is provided with a longitudinal bore, which bore connects to the feed-through formed in the arm on the one hand and to a winding bore formed in the winding shaft on the other hand.

14. 14. A device according to claim 13, **characterized in that** the bore is right-angled near the connection to the feed-through channel formed in the twisting arm.

15. 15. A device according to claim 13 or 14, **characterized in that**

the winding bore is right-angled.

16. A device according to any one or more of the claims 12-15, **characterized in that** the bore in the twisting shaft is provided with friction-reducing means.

5 17. A device according to claim 16, **characterized in that** said friction-reducing means comprise one or more ceramic guide surfaces in the bore.

18. A device according to any one or more of the preceding claims, **characterized in that** the winding shaft is provided with a 10 support, on which the drive means for the winding element are placed.

19. A device according to claim 18, **characterized in that** the support consists of a first supporting shaft, which is connected to the winding shaft, and a second supporting shaft, which is pivotally connected to the first supporting shaft.

15 20. A device according to claim 19, **characterized in that** the drive means comprise a driving roller which is rotatably mounted to the second supporting arm and which can be placed into abutment with the winding element.

21. A device according to claim 20, **characterized in that** the 20 driving roller can be placed into abutment with the winding element with an adjustable force by power means.

22. A device according to claim 21, **characterized in that** said power means comprise a gas spring or a tension spring.

23. A device according to any one or more of the claims 19-22, **characterized in that** a rotatably driven guide roller extending parallel to the driving roller is mounted on the second supporting arm, which guide roller is provided with winding grooves extending over the circumferential surface thereof for carrying the elongate, threadlike element to the winding element.

30 24. A device according to claim 23, **characterized in that** a guide element extending parallel to the guide roller is provided on the

second supporting arm, over which guide element the elongate, threadlike element can be carried in the direction of the guide roller.

25. A device according to claim 23 or 24, **characterized in that** the first end of the twisting shaft is provided with circumferential teeth for driving the winding element via the driving roller, which teeth rotatably drive the driving roller and the guide roller via one or more gear transmissions upon rotation of the twisting shaft.

10 26. A device according to any one or more of the claims 20-25, **characterized in that** the support is provided with one or more guide wheels for guiding the elongate, threadlike element from the winding bore to the winding element via the guide element and the guide roller.

15 27. A device according to any one or more of the claims 2-26, **characterized in that** guide means are provided on the support, which guide means extend in radial direction, beyond the free end of the winding shaft, for carrying the elongate, threadlike element arriving from the inlet, over the winding element, towards the twisting arm.

28. A device according to any one or more of the preceding claims, **characterized in that** brake means for the elongate, threadlike element are provided near the inlet opening.

20 29. A device according to claim 28, **characterized in that** the brake means comprise a first brake unit built up of at least three braking wheels, over which the elongate, threadlike element can be passed, with at least one braking wheel being movable with respect to the other braking wheels.

25 30. A device according to claim 28 or 29, **characterized in that** the brake means furthermore comprise a second brake unit, which is built up of two spaced-apart rotatable brake elements, each brake element being provided with a number of winding grooves formed in the circumferential surface thereof for receiving a number of windings of the elongate, threadlike element.

30 31. A device according to claim 30, **characterized in that** at

least one brake element is freely rotatable in the device.

32. A device according to claim 30 or 31, **characterized in that** at least the other brake element is rotatably mounted in the device via a friction brake, for example a magnetic brake.

5 33. A device according to any one or more of the preceding claims, **characterized in that** slackening means are present in the frame for releasing the tension in the elongate, threadlike element.

34. A device according to claim 33, **characterized in that** said slackening means comprise a rotatably driven guide disc for the elongate, threadlike element.

10 35. A device according to claim 34, **characterized in that** the direction of rotation of the guide disc and the direction of transport of the elongate, threadlike element are oriented alike.

36. A device according to claim 34 or 35, **characterized in that** the guide disc can be driven via a magnetic coupling.

15 37. A device according to any one or more of the claims 33-36, **characterized in that** the guide disc is provided with a groove.

38. A device according to any one or more of the claims 33-37, **characterized in that** the slackening means are present on the support.